BALD HILLS PRAIRIES RAPTOR SURVEY IN REDWOOD NATIONAL PARK
2013 ANNUAL REPORT
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Introduction

Raptor surveys throughout the Bald Hills in Redwood National Park ("the park") began in December of 1998. Originally, the surveys were ancillary to a study designed to determine effects of prescribed fire on small mammal and reptile populations in coastal prairie grasslands in the park. Though the small mammal/reptile study was discontinued after the 2001 field season, raptor surveys continued in each year through the present and results have been reported annually.

Methods

The raptor survey uses 32 survey stations located along Bald Hills Road from the park's western-most prairie, Ganns Prairie, to Coyote Creek/Eastside Prairies at the southeastern boundary of the park. At each station all raptors, ravens, and crows (along with mammalian predators including coyote, gray fox, and bobcat) are recorded. Observations are hand-plotted in the field on aerial photos, and information about each raptor is documented. An "observation" is defined as one bird, or multiple birds of the same species seen together. Information collected includes:

- species,
- sex (if it can be determined),
- activity (perched, flying, hovering, feeding),
- substrate used (tree, ground or rock, post or fence, brush, and low, medium, or high flight level).

At each station, the observer spends a minimum of 2 minutes observing the surrounding landscape with binoculars looking for flying and perched raptors. Every attempt is made to avoid double-counting raptors in flight by noting flight direction. Incidental raptor observations, e.g., raptors seen enroute between stations, also are noted on the field form and mapped. The goal is to conduct one survey per month during the year. The initial starting point for the survey is alternated between months, between the lower elevation Ganns Prairie and upper elevation Coyote Creek/Eastside Prairies.

Hand-plotted observation locations are digitally plotted and assigned X-Y UTM coordinates. Data are entered into an Access database. Species taxonomic names are included in an appendix.

Results and Discussion

Eleven surveys were conducted in 2013; no surveys took place in the month of October. The total number of raptor observations in 2013 was 122, consisting of 178 individuals. The number of observations was up substantially from last year's number (107) and also was substantially higher than the number of observations in 2008 (91), the high for the 4-year period between 2006-2009. The number of individuals counted was equal to that of last year, and comparable to the number recorded in 2010 (170). Two relatively large groups of ravens contributed to the number of individuals observed for that species.

The highest number of raptor observations in 2013 was in Coyote Creek Prairie (29). This is similar to the numbers recorded in 2010-2012. Childs Hill Prairie was once again in second place (21) for overall numbers after falling short in 2012. In the lower group of prairies (Ganns, Elk Camp, and Dolason) there were 16 observations (13%), and in the middle prairies (Airstrip, Counts Hill, Maneze, Childs Hill, and Williams Ridge) there were 57 observations (47%). The upper prairies (Copper Creek, Coyote Creek, Schoolhouse and Eastside) accounted for 49 observations (40%). There were no raptor observations in Wooden Gate Prairie in 2013. Differences in numbers of observations between the lower prairies, versus the middle and upper prairies, likely equate to the differences in area among the prairies; with grassland area progressively increasing eastward. There were 3 observations in Ganns, the smallest, and lowest elevation prairie, in 2013.

For the second consecutive year, common ravens accounted for the highest number of individuals recorded, at 96, only 9 fewer than the 105 detected in 2012. However, the highest number of a species *observations*, were red-tailed hawks with 51 observations, compared to 44 observations of ravens. Red-tailed hawk and raven observations were followed by American kestrel (see table below). These 3 species have consistently been the most numerous of the surveys. Northern harriers were again the 4th most commonly observed species, with just 4 observations of 4 individuals. For the second year species not detected, compared to 2011, were merlin, white-tailed kite, American crow, and peregrine falcon. No mammalian carnivores were observed in the prairies in 2013.

Numbers of individuals of all species recorded in 2013, compared with those from 2010, 2011, 2012, and the previous 4-year and 3-year periods are listed in the table below (from Sakai et al., 2000a, 2000b, and 2001; Sakai 2002, 2003, 2004, 2005; Schmidt 2010; NPS 2011, 2012, and 2013). It is probable that some of the records represent the same individual observed in different surveys, due to the territorial nature of most hawks, however, except in rare cases there is no way of determining if the birds are the same or different individuals.

Species	No. of Individuals Observed in 2013	No. of Individuals Observed in 2012	No. of Individuals Observed in 2011	No. of Individuals Observed in 2010	No. of Individuals Observed, 2006-2009	No. of Individuals Observed, 2002-2005	No. of Individuals Observed, 1999-2001
Red-tailed Hawk	55	36	46	68	135	168	165
Common Raven	96	105	77	61	98	300	77
American Kestrel	14	14	20	15	33	118	95
Northern Harrier	4	10	3	16	18	20	41
Rough-legged Hawk	0	0	0	4*	6*	6	7
Red-shouldered Hawk	1	0	0	0	3	3	1
Cooper's Hawk	0	1	0	0	3	0	0
Sharp-shinned Hawk	2	3	0	1	2	0	0
Bald Eagle	0	1	1	0	2	8	2
Golden Eagle	0	0	0	2	2	0	0
White-tailed Kite	0	0	1	0	2	28	17
Merlin	0	2	1	1	2	2	0
Peregrine Falcon	0	0	1	0	1	0	0
American Crow	0	0	1	0	1	0	0

Species	No. of Individuals Observed in 2013	No. of Individuals Observed in 2012	No. of Individuals Observed in 2011	No. of Individuals Observed in 2010	No. of Individuals Observed, 2006-2009	No. of Individuals Observed, 2002-2005	No. of Individuals Observed, 1999-2001
Unknown Falcon	0	1	0	1	0	0	0
Unknown Buteo	3	1	0	0	0	0	0
Unknown Accipter	0	1	0	0	0	0	0
Unknown "Hawk"	3	3	5	0	0	0	0
Osprey	0	0	0	0	0	1	0
Coyote	0	0	2	0	1	3	5
Bobcat	0	0	0	0	0	3	3

* The late 2009 and early 2010 observations were likely the same bird, based on its location and plumage characteristics.

Numbers of individuals of various species, including common species such as red-tailed hawk and American kestrel, may fluctuate widely among years. However, the numbers of four focal species (red-tailed hawk, American kestrel, and common raven) observed annually since 1999 indicate the possibility that raptor numbers in the Bald Hills are stable, with the exception of American kestrel, who's numbers have declined since 2003 (Fig. 1).

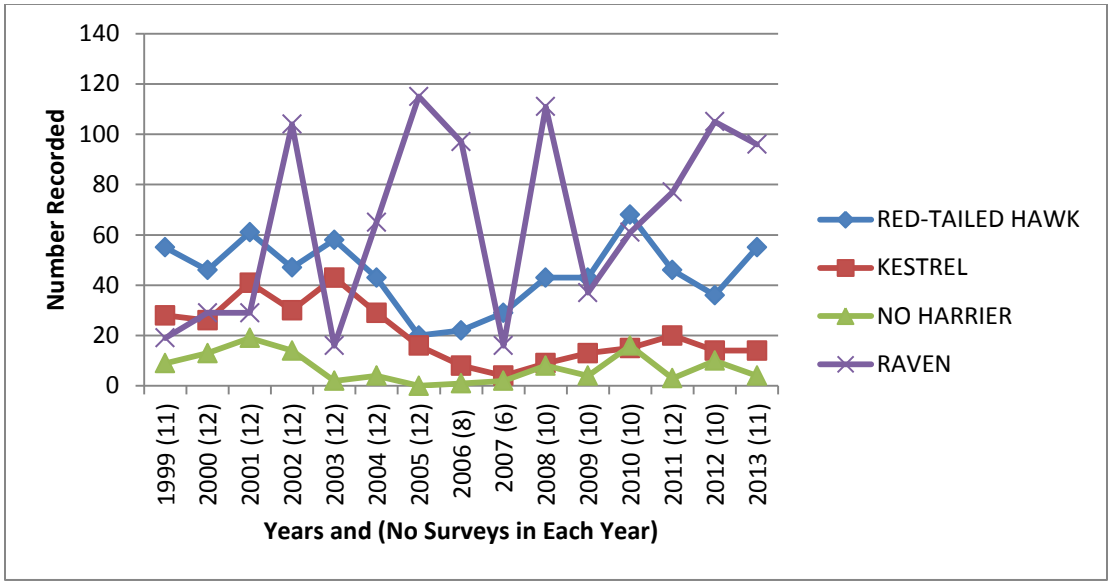

Figure 1. Numbers of individuals of four focal species counted from 1999 through 20132 in the Bald Hills.

Common raven numbers have also fluctuated dramatically over the years, and declined slightly in 2013 after increasing in the previous 3 years of surveys. There may be a relationship between the amount of prairie burning and numbers of ravens counted in the Bald Hills (see Figure 2). Ravens are attracted to burned areas due to the highly available food resources exposed in burned prairies.

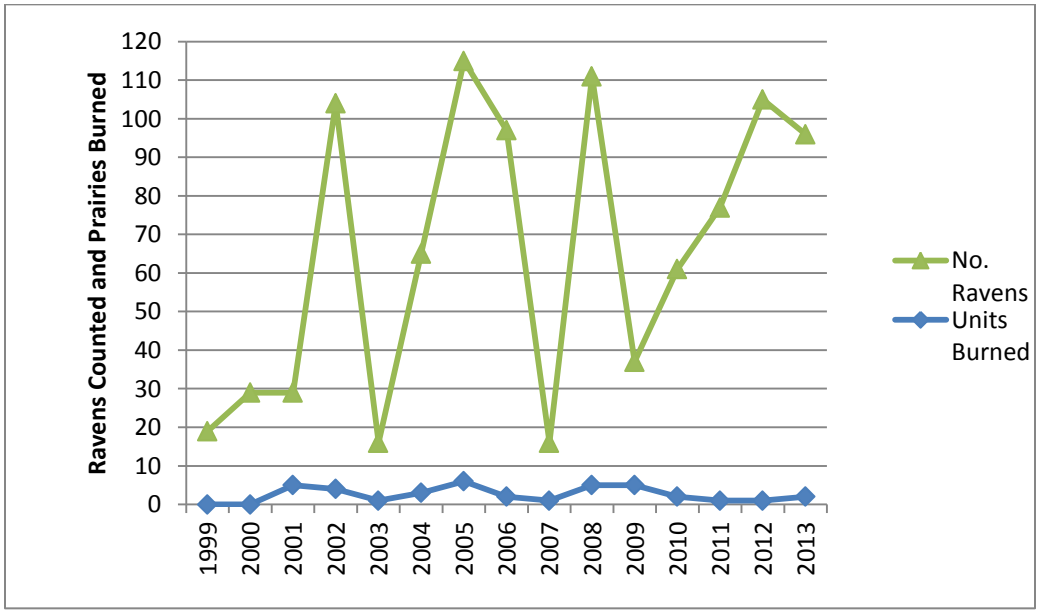

Figure 2. Common raven numbers in relation to the number of prairies burned each year in the Bald Hills.

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APPENDIX. Taxonomic names of birds referred to in text.

Osprey	*Pandion haliaetus*
White-tailed Kite	*Elanus leucurus*
Bald Eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*

Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Rough-legged Hawk	*Buteo lagopus*
Golden Eagle	*Aquila chrysaetos*

American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*

American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*

Peregrine Falcon	*Falco peregrinus*